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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,003	06/20/2001	Alfred J. Huang	SUNIP710/P5267	5241

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EXAMINER

RAMPURIA, SATISH

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 05/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/886,003

Applicant(s)

HUANG, ALFRED J.

Examiner

Satish S. Rampuria

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06/20/2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>01/04/2002</u> . | 6) <input type="checkbox"/> Other: _____  |

***DETAILED ACTION***

1. This action is in response to the application filed on 06/20/2001.
2. Claims 1-27 are pending.

***Information Disclosure Statement***

3. An initialed and dated copy of Applicant's IDS form 1449, Paper No. 02, is attached to the instant Office action.

***Drawings***

4. The drawings are objected to because figures 1-4 the reference numbers are not readable, figure 2 is improperly linked by reference numeral 204, and figures 2 and 4 label "Compiler" and "Assembler", respectively, is not referenced by numeral.
5. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112, second paragraph***

6. Claims 1, 6, 7, 23, 24, 25, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Clarification and/or correction are required.

Regarding, claim 1, on page 20, lines 6, 8, 9, 11, and 13 the limitation, "or" is unclear as to assembly code includes only one directive or several directives.

Claim 6, has the similar limitation to those in claim 1 with respect to "or", recited on page 20 and 21, lines 30, 1, and 3.

Claim 7, has the similar limitation to those in claim 1 with respect to "or", recited on page 21, lines 11.

Claim 23, has the similar limitation to those in claim 1 with respect to "or", recited on page 23, lines 11, and 13.

Claim 24, has the similar limitation to those in claim 1 with respect to "or", recited on page 23, lines 24, 25, and 26.

Claim 25, has the similar limitation to those in claim 1 with respect to "or", recited on page 24, lines 3, 4, and 6.

Claim 26, has the similar limitation to those in claim 1 with respect to "or", recited on page 24, lines 13, 15, 17, and 19.

The rejection of the base claim is necessarily incorporated into the dependent claims.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-2, 5-7, 12, 16, and 23-26 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,289,446 to Nilsson, hereinafter called Nilsson.

**Per claim 1, 2, 5, 6, 7, 16, 26:**

Nilsson disclose:

- In a compiler (col. 10, line 29 “includes a compiler 153”), a method of generating assembly code (col. 10, line 37 ““compiles” or generates object module(s) 163”) to aid in stack unwinding of a memory stack (col. 7, lines 24 “A stack unwinder”)
- obtaining one or more source code lines (col. 20, lines 26-27 “generating the program code from source code”)
- generating assembly code for the one or more source code lines(col. 20, lines 26-27 “generating the program code from source code”)
- the assembly code including one or more stack unwind assembler directives (col. 7, lines 63-65 “sequence instructions comprises one or more functions... characterized by unwind information”)
- each of the stack unwind assembler directives (col. 7, line 24 “A stack unwinder”) having one or more associated stack unwind sub directives (col. 7 and col. 8 line 66 and 1 “in-code context data comprises at least a subset of unwind information”)
- each of the stack unwind assembler directives (col. 7, line 24-25 “A stack unwinder... unwinds the stack...” being adapted for indicating to an assembler that one or more encoded data sections (col. 12, line 3 “bits... encode the stack layout”) containing information to be used (col. 7 and col. 8 line 66 and 1 “in-code context data comprises at

least a subset of unwind information”) during stack unwinding is to be generated from the one or more associated stack unwind sub directives (col. 7, line 24-25 “A stack unwinder... unwinds the stack... locate context tables... functions popped ... stack during unwinding...”)

**Per claim 12:**

The rejection of claim 7 is incorporated, and further, Nilsson disclose:

- wherein the stack unwind sub directive indicates a number of entries in the stack (col. 12, line 1 “stack-pointer is used as the base for this context”)

*Claim 23* is the computer program product claim corresponding to method claim 1 and rejected under the same rational set forth in connection with the rejection of claim 1 above.

*Claims 24 and 25* are the apparatus claim corresponding to method claim 1 and rejected under the same rational set forth in connection with the rejection of claim 1 above.

substantially as claimed.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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10. Claims 3, 4, 8, 9, 10, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson in view of US Patent No. 6,314,564 to Charles et al., hereinafter called Charles.

**Per claims 3, 4, 8, 10, and 27:**

The rejection of claims 1, 7 and 26 is incorporated, respectively, and further, Nilsson disclose:

- wherein each stack unwind sub directive indicates (col. 7, line 24-25 "A stack unwinder... unwinds the stack...") using the one or more encoded data sections (col. 12, line 3 "bits... encode the stack layout")

Nilsson does not explicitly disclose stack operations that are to be reversed/previously performed by a stack unwind mechanism.

However, Charles discloses in an analogous computer system stack operations that are to be reversed by a stack unwind mechanism (col. 3, lines 26-30 "relocation entries of object files by including stack operations in the relocation entries... by adding PUSH, POP... postfix notation (also known as "reverse Polish notation)").

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of reverse stack operation during linking or compiling code as taught by Charles into the method of unwinding the stack at the exception as taught by Nilsson. The modification would be obvious because of one of ordinary skill in the art would be motivated to use the reverse stack operation because stack is well known way to store data such that the last object put in the stack is first object retrieved, last in first out as suggested by Charles (col. 3, lines 13-22).

**Per claim 9:**

The rejection of claim 8 is incorporated, and further, Nilsson disclose:

- wherein the region operation designates a prologue region of a function or a body region of a function (col. 7, lines 46-49 “Logic is coupled to the instruction fetch logic... updates... instruction pointer in response to the detection of the context-call-instruction by the instruction decode logic”)

11. Claims 11, 13-15, 17-21 and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nilsson in view of US Patent No. 6,293,712 to Coutant, hereinafter called Coutant.

**Per claims 11, 13, 14, 15, 17, 18, 19, 20, and 22:**

The rejection of claim 7 is incorporated, and further, Nilsson does not disclose the stack unwind sub directive indicates whether the stack has a fixed size or a variable size, stack pointer, destination register, and stack offset.

However, Coutant discloses in an analogous computer system the stack unwind sub directive indicates whether the stack has a fixed size or a variable size, stack pointer, destination register, and stack offset (col. 5, lines 20-30 “Table 1- mem\_stack\_f Specifies a fixed-size memory stack frame, when the stack pointer (SP) is modified, and the size of the frame. mem\_stack\_v Specifies a variable-size memory stack, and when the Previous Stack Pointer (PSP) is saved. rp\_when Specifies when the Return Pointer (RP) is saved. spill\_base Specifies a base of a spill area in a memory stack, as PSP-relative offset”).



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Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the method of using fixed or variable size stack memory, pointer, register, and stack offset as taught by Coutant into the method of unwinding the stack at the exception as taught by Nilsson. The modification would be obvious because of one of ordinary skill in the art would be motivated to use fixed or variable stack memory, register and stack offset to optimize the procedure for unwinding the stack as suggested by Coutant (col. 2, lines 21-31).

**Per claim 21:**

The rejection of claim 19 is incorporated, and further, Nilsson disclose:

- wherein the second register is of type branch, floating point, or general purpose (col. 12 and 13, lines 67 and 1 “plurality of general registers 402 commonly referred to as a register file is provided”)

*Claims 26 and 27* are the computer program product claim corresponding to method claims 1 and 3, respectively, and rejected under the same rationale set forth in connection with the rejection of claims 1 and 3, respectively, above.

***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patent is cited to further show the state of the art with respect to stack unwinding process.

US Patent No. 6,014,515 to Burch

US Patent No. 5,628,016 to Kukol

US Patent No. 5,175,828 to Hall et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish S. Rampuria whose telephone number is 703-305-8891. The examiner can normally be reached on 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on (703) 305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

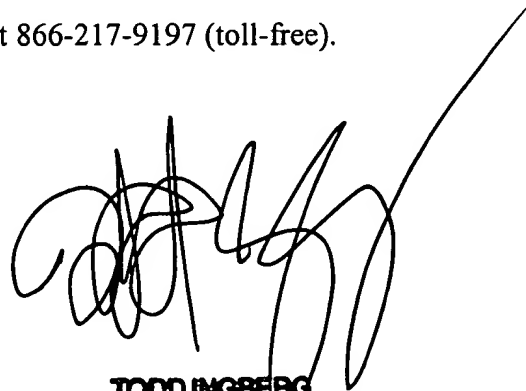
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Satish S. Rampuria

Patent Examiner

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05/03/2004



**TODD INGBERG**  
**PRIMARY EXAMINER**